


Substitution for form 1449A/USPO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Complete if Known	
		Application Number	09/882,363
		Filing Date	June 15, 2001
		First Named Inventor	ALEXANDER
		Group Art Unit	6739
		Examiner Name	J. FOREMAN
		Attorney Docket Number	6750-0007 (SU98-01.US2)
Sheet	1	of	7

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Number	Kind Code ² (if known)		
JF	A1	4,823,807		Russell, et al.	04-25-1989
	A2	5,099,859	A	Bell	03-31-1992
	A3	5,154,178	A	Shah	10-13-1992
	A4	5,246,013	A	Frank et al.	09-21-1993
	A5	5,433,215	A	Athanasios et al.	07-18-1995
	A6	5,503,162	A	Athanasios et al.	04-02-1996
	A7	5,541,515	A	Tsujita	07-30-1996
	A8	5,564,437	A	Bainville et al.	10-15-1996
	A9	5,682,886	A	Delp et al.	11-04-1997
	A10	5,749,362	A	Funda et al.	05-12-1998
	A11	5,772,595	A	Votruba et al.	06-30-1998
	A12	5,779,651	A	Buschmann et al.	07-14-1998
	A13	5,810,006	A	Votruba et al.	09-22-1998
	A14	5,824,085	A	Sahay et al.	10-20-1998
	A15	5,880,976	A	DiGioia III et al.	03-09-1999
	A16	5,899,859	A	Votruba et al.	05-04-1999
	A17	5,995,738	A	DiGioia III et al.	11-30-1999
	A18	6,002,859	A	DiGioia III et al.	12-14-1999
	A19	6,175,655	B1	George III et al.	01-16-2001
	A20	6,310,619	B1	Rice	10-30-2001
	A21	6,450,978	B1	Brosseau et al.	09-17-2002
JF	A22	6,533,737	B1	Brosseau et al.	03-18-2003

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Office ³	Number ⁴	Kind Code ⁵ (if known)		

Examiner Signature		Date Considered	9/30/03
--------------------	---	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² See attached Kinds of U.S. Patent Documents.

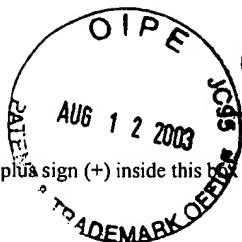
³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language Translation is attached.

Please type a plus sign (+) inside this box → ☐



PTO/SB/08A (08-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				<i>Complete if Known</i>	
				Application Number	09/882,363
				Filing Date	June 15, 2001
				First Named Inventor	ALEXANDER
				Group Art Unit	6739
				Examiner Name	J. FOREMAN
Sheet	2	of	7	Attorney Docket Number	6750-0007 (SU98-01.US2)

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		
JF	C1	ADAM et al., "NMR tomography of the cartilage structures of the knee joint with 3D-volume imag combined with a rapid optical-imaging computer," <i>ROFO Fortschr. Geb. Rontgenstr. Nuklearmed.</i> 150(1):44-48, 1989		
	C2	BASHIR et al., "Validation of Gadolinium-Enhanced MRI of GAG Measurement in Human Cartilage"		
	C3	BORTHAKUR et al., "In Vivo Triple Quantum Filtered Sodium MRI of Human Articular Cartilage"		
	C4	BRET et al., "Quantitative analysis of biomedical images," University of Manchester, Zeneca Pharmaceuticals, IBM UK, http://www.wiau.man.ac.uk/~ads/imv		
	C5	BUTTERWORTH et al., Depts of Biomedical Engineering, Medicine, Neurology, & Center for Nuclear Imaging Research, University of Alabama at Birmingham, USA		
	C6	CARANO et al., "Estimation of erosive changes in rheumatoid arthritis by temporal multispectral analysis"		
	C7	CHAN et al., "Osteoarthritis of the knee: comparison of radiography, CT, and MR imaging to asse extent and severity," <i>AJR Am J Roentgenol</i> 157(4):799-806, 1991		
	C8	COHEN et al., "Knee cartilage topography, thickness, and contact areas from MRI: in-vitro calibration and in-vivo measurements," <i>Osteoarthritis and Cartilage</i> 7:95-109, 1999		
	C9	DARDZINSKI et al., "T1-T2 Comparison in Adult Articular cartilage," <i>ISMRM Seventh Scientific Meeting</i> , Philadelphia, PA, May 22-28, 1999		
	C10	DARDZINSKI et al., "Entropy Mapping of Articular Cartilage"		
JF	C11	DUFOUR et al., "A Technique for the Dynamical Evaluation of the Acromiohumeral Distance of the Shoulder in the Seated Position under Open-field MRI"		

Examiner Signature		Date Considered	9/30/03
--------------------	--	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

Please type a plus sign (+) inside this box →



PTO/SB/08A (08-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	09/882,363
		Filing Date	June 15, 2001
		First Named Inventor	ALEXANDER
		Group Art Unit	6739
		Examiner Name	J. FOREMAN
Sheet 3 of 7	Attorney Docket Number	6750-0007 (SU98-01.US2)	

O I P E
AUG 1 2 2003
PATENT & TRADEMARK OFFICE

RECEIVED
AUG 1 4 2003
TECHNOLOGY CENTER Rm 9700

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
JF	C12	ECKSTEIN et al., "Side differences of knee joint cartilage volume, thickness, and surface area, and correlation with lower limb dominance - an MRI-based study," <i>Osteoarthritis and Cartilage</i> 10: 914 - 921 (2002)	
	C13	ECKSTEIN et al., "Determination of knee joint cartilage thickness using three-dimensional magnetic resonance chondrocrassometry (3D MR-CCM)," <i>Magn. Reson. Med.</i> 36(2):256-265, 1996	
	C14	ECKSTEIN et al., "New quantitative approaches with 3-D MRI: cartilage morphology, function and degeneration," <i>Medical Imaging International</i> , November-December, 1998	
	C15	ECKSTEIN et al., "Effect of gradient and section orientation on quantitative analyses of knee joint cartilage," <i>Journal of Magnetic Resonance Imaging</i> 11: 161 - 167 (2000)	
	C16	ECKSTEIN et al., "Functional analysis of articular cartilage deformation, recovery, and fluid flow following dynamic exercise in vivo," <i>Anatomy and Embryology</i> 200: 419 - 424 (1999)	
	C17	ECKSTEIN et al., "Effect of physical exercise on cartilage volume and thickness in vivo: an MR imaging study," <i>Radiology</i> 207: 243 - 248 (1998)	
	C18	FABER et al., "Quantitative Changes of Articular Cartilage Microstructure During Compression of an Intact Joint"	
	C19	FABER et al., "Gender differences in knee joint cartilage thickness, volume and articular surface areas: assessment with quantitative three-dimensional MR imaging," <i>Skeletal radiology</i> 30(3):144-150, 2001	
	C20	GHOSH et al., "Watershed Segmentation of High Resolution Articular Cartilage Images for assessment of OsteoArthritis"	
	C21	GLASER et al., "Optimization and validation of a rapid highresolution T1-w 3D Flash waterexcitation MR sequence for the quantitative assess-ment of articular cartilage volume and thickness," <i>Magnetic Resonance Imaging</i> 19: 177 --185 (2001)	
JF	C22	GOODWIN et al., "MR Imaging of Articular Cartilage: Striations in the Radial Layer Reflect the Fibrous Structure of Cartilage"	

Examiner Signature		Date Considered	6/30/03
--------------------	--	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

Please type a plus sign (+) inside this box →



PTO/SB/08A (08-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	09/882,363
		Filing Date	June 15, 2001
		First Named Inventor	ALEXANDER
		Group Art Unit	6739
		Examiner Name	J. FOREMAN
Sheet 4	of 7	Attorney Docket Number	6750-0007 (SU98-01.US2)

RECEIVED
AUG 14 2003
TECHNOLOGY CENTER #3700

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS		
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
JF	C23	GRAICHEN et al., "Three-dimensional analysis of the width of the subacromial space in healthy subjects and patients with impingement syndrome," <i>American Journal of Roentgenology</i> 172: 1081 - 1086 (1999)
	C24	GANDY et al., "One-year longitudinal study of femoral cartilage lesions in knee arthritis", 1999
	C25	HALL et al., "Quantitative MRI for clinical drug trials of joint diseases; Virtual Biopsy of articular cartilage"
	C26	HARDY et al., "The influence of the resolution and contrast on measuring the articular cartilage volume in magnetic resonance images," <i>Magn Reson Imaging</i> . 2000 Oct; 18(8):965-72
	C27	HARDY et al., "Measuring the thickness of articular cartilage from MR images," <i>J. Magnetic Resonance Imaging</i> 13:120-126, 2001
	C28	HARGREAVES et al., "MR Imaging of Articular Cartilage Using Driven Equilibrium," <i>Magnetic Resonance in Medicine</i> 42(4):695-703 (October 1999)
	C29	HARGREAVES et al., "MR Imaging of Articular Cartilage Using Driven Equilibrium"
	C30	HAUT et al., "A High Accuracy Three-Dimensional Coordinate Digitizing System for Reconstructing the Geometry of Diarthrodial Joints," <i>J. Biomechanics</i> 31:571-577, 1998
	C31	HERBERHOLD et al., "In situ measurement of articular cartilage deformation in intact femoropatellar joints under static loading," <i>Journal of Biomechanics</i> 32: 1287 - 1295 (1999)
	C32	HERBERHOLD et al., "An MR-based technique for quantifying the deformation of articular cartilage during mechanical loading in an intact cadaver joint," <i>Magnetic Resonance in Medicine</i> 39: 843 - 850 (1998)
JF	C33	HIGH et al., "Early Macromolecular Collagen Changes in Articular Cartilage of Osteoarthritis (OA): An <i>In Vivo</i> MT-MRI and Histopathologic Study"

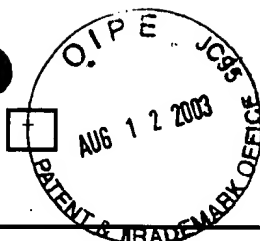
Examiner Signature		Date Considered	9/30/03
--------------------	--	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

Please type a plus sign (+) inside this box →



PTO/SB/08A (08-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	09/882,363
		Filing Date	June 15, 2001
		First Named Inventor	ALEXANDER
		Group Art Unit	6739
		Examiner Name	J. FOREMAN
Sheet 5 of 7	Attorney Docket Number	6750-0007 (SU98-01.US2)	

RECEIVED
AUG 14 2003
TECHNOLOGY CENTER #3700

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
UF	C34	HOHE et al., "Surface size, curvature analysis, and assessment of knee joint incongruity with MR imaging in vivo," <i>Magnetic Resonance in Medicine</i> , 47:554-561(2002)	
	C35	KAUFMAN et al., "Articular Cartilage Sodium content as a function of compression"	
	C36	KLOSTERMAN et al., "T ₂ Measurements in Adult Patellar Cartilage at 1.5 and 3.0 Tesla," <i>ISMRM Seventh Scientific Meeting</i> , Philadelphia, PA, May 22-28, 1999	
	C37	KNAUSS et al., "Self-Diffusion of Water in Cartilage and Cartilage Components as Studied by Pulsed Field Gradient NMR," <i>Magnetic Resonance in Medicine</i> 41:285-292 (1999)	
	C38	KORHONEN et al., "Importance of the superficial tissue layer for the indentation stiffness of articular cartilage," <i>Med Eng Phys.</i> 2002 Mar;24(2):99-108	
	C39	KSHIRSAGAR et al., "Measurement of localized cartilage volume and thickness of human knee joints by computer analysis of three-dimensional magnetic resonance images," <i>Invest Radiol.</i> May;33(5):289-99, 1998	
	C40	LÜSSE et al., "Measurement of distribution of water content of human articular cartilage based on transverse relaxation times: an in vitro study"	
	C41	LÜSSE et al., "Measurement of distribution of water content of human articular cartilage based on transverse relaxation times: an in vitro study"	
	C42	MERKLE et al., "A transceive coil assembly for hetero-nuclear investigations of human breast at 4 T"	
	C43	MILLS et al., "Magnetic resonance imaging of the knee: evaluation of meniscal disease," <i>Curr. Opin. Radiol.</i> 4(6):77-82, 1992	
Jf	C44	MODEST et al., "Optical verification of a technique for in situ ultrasonic measurement of articular cartilage thickness," <i>J. Biomechanics</i> 22(2):171-176, 1989	

Examiner Signature		Date Considered	8/31/02
--------------------	--	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

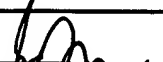
Please type a plus sign (+) inside this box

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	09/882,363
		Filing Date	June 15, 2001
		First Named Inventor	ALEXANDER
		Group Art Unit	6739
		Examiner Name	J. FOREMAN
Sheets	6	of	7
		Attorney Docket Number	6750-0007 (SU98-01.US2)

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
JF	C45	MUNDINGER et al., "Magnetic resonance tomography in the diagnosis of peripheral joints," <i>Schweiz Med. Wochenschr.</i> 121(15):517-527, 1991	abstract
	C46	NIEMINEN et al., "T ₂ Indicates Incompletely the Biomechanical Status of Enzymatically Degraded Articular Cartilage at 9.4T"	
	C47	NISHII et al., "Three dimensional Evaluation of the acetabular and femoral articular cartilage in the osteoarthritis of the Hip joint"	
	C48	PARKKINEN et al., "A mechanical apparatus with microprocessor controlled stress profile for cyclic compression of cultured articular cartilage explants," <i>J Biomech.</i> 1989;22(11-12):1285-91	
	C49	PILCH et al., "Assessment of cartilage volume in the femorotibial joint with magnetic resonance imaging and 3D computer reconstruction," <i>J. Rheumatol.</i> 21(12):2307-2321, 1994	
	C50	POTTER et al., "Sensitivity of Quantitative NMR Imaging to Matrix Composition in Engineered Cartilage Tissue"	
	C51	PROBST et al., "Technique for measuring the area of canine articular surfaces," <i>Am. J. Vet. Res.</i> 48(4):608-609, 1987	
	C52	REISER et al., "Magnetic resonance in cartilaginous lesions of the knee joint with three-dimensional gradient-echo imaging," <i>Skeletal Radiol.</i> 17(7):465-471, 1988	
	C53	Robarts Research Institute, Abstract #1028	
	C54	ROBSON et al., "A combined analysis and magnetic resonance imaging technique for computerized automatic measurement of cartilage thickness in distal interphalangeal joint," <i>Magnetic Resonance Imaging</i> 13(5):709-718, 1995	
JF	C55	SHAPIRO et al., "In-Vivo Evaluation of Human Cartilage Compression and Recovery using 1H and 23Na MRI"	

Examiner Signature		Date Considered	9/31/03
--------------------	---	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

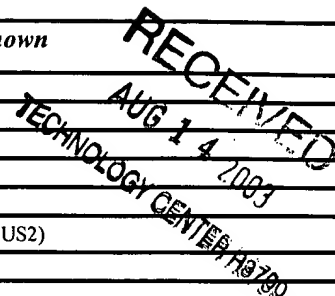
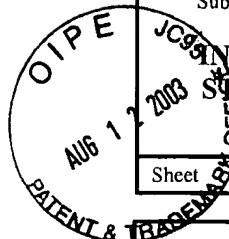
² Applicant is to place a check mark here if English language Translation attached.

Please type a plus sign (+) inside this box →



PTO/SB/08A (08-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	09/882,363
		Filing Date	June 15, 2001
		First Named Inventor	ALEXANDER
		Group Art Unit	6739
		Examiner Name	J. FOREMAN
Sheet 7 of 7	Attorney Docket Number	6750-0007 (SU98-01.US2)	



OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
JP	C56	SOLLOWAY et al., "The use of active shape models for making thickness measurements of articular cartilage from MR images," <i>Magn Reson Med</i> . 1997 Jun;37(6):943-52	
	C57	STAMMBERGER et al., "A New Method for 3D Cartilage Thickness Measurement with MRI, Based on Euclidean Distance Transformation, and its Reproducibility in the Living"	
	C58	STAMMBERGER et al., "Elastic registration of 3D cartilage surfaces from MR image data for detecting local changes of the cartilage thickness," <i>Magnetic Resonance in Medicine</i> 44: 592-601 (2000)	
	C59	STAMMBERGER et al., "A method for quantifying time dependent changes in MR signal intensity of articular cartilage as a function of tissue deformation in intact joints," <i>Medical Engineering & Physics</i> 20:741-749, 1998	
	C60	TEBBEN et al., "Three-dimensional computerized reconstruction. Illustration of incremental articular cartilage thinning," <i>Invest. Radiol.</i> 32(8):475-484, 1997	
	C61	VANDE BERG et al., "Assessment of knee cartilage in cadavers with dual-detector spiral CT arthrography and MR imaging," <i>J. Radiology</i> . 2002 Feb; 222(2):430-436	
	C62	VELYVIS et al., "Evaluation of Articular Cartilage with Delayed Gd(DTPA)2-Enhanced MRI: Promise and Pitfalls"	
	C63	WARFIELD et al., "Automatic Segmentation of MRI of the Knee"	
	C64	WARFIELD et al., "Adaptive template moderated spatially varying statistical classification," Proc. First International Conference on Medical Image Computing and Computer Assisted ..., MICCAI 1998, pp. 231-238	
	C65	WARFIELD et al., "Adaptive, Template Moderated Spatially Varying Statistical Classification," <i>Medical Image Analysis</i> 4(1): 43-55, 2000	
JP	C66	WAYNE et al., "Measurement of articular cartilage thickness in the articulated knee," <i>ANN Biomed Eng.</i> 1998 Jan-Feb; 26(1):96-102	

Examiner Signature		Date Considered	5/30/03
--------------------	--	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.